

PITHOLE STONE ARCH BRIDGE

Pennsylvania Historic Bridges Recording Project

Spanning Pithole Creek at Eagle Rock Rd. (State Rt. 1004)

Pithole

Venango County

Pennsylvania

HAER No. PA-466

HAER  
PA  
61-PIT,  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

1849 C Street, NW

Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

PITHOLE STONE ARCH BRIDGE

HAER No. PA-466

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Location: Spanning Pithole Creek at Eagle Rock Rd. (State Route 1004), Pithole, Venango County, Pennsylvania.

USGS Quadrangle: President, Pennsylvania (7.5-minute series, 1972).

UTM Coordinates: 17/617250/4593550

Date of Construction: 1898.

Designer: President and Cornplanter Townships and Venango County.

Builder: Richard A. Bigley, contractor.

Present Owner: Pennsylvania Department of Transportation.

Present Use: Vehicular bridge.

Significance: The Pithole Stone Arch Bridge is significant as a late nineteenth-century example of a rural masonry bridge constructed at a time when most of its counterparts were built in the more common metal truss types. Although considered substandard at the time of its construction, this bridge's short span and low rise contribute make its engineering compensation by the construction of massive abutments an outstanding and enduring example of nineteenth-century craftsmanship. The Pithole Stone Arch Bridge was listed in the National Register of Historic Places in 1988.

Historian: Dr. David S. Rotenstein, August 1997.

Project Information: This bridge was documented by the Historic American Engineering Record (HAER) as part of the Pennsylvania Historic Bridges Recording Project - I, co-sponsored by the Pennsylvania Department of Transportation (PennDOT) and the Pennsylvania Historical and Museum Commission during the summer of 1997. The project was supervised by Eric DeLony, Chief of HAER.

## CHRONOLOGY

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|-------------------|--|
| 23 August 1897    | Residents of President and Cornplanter townships petition Venango County to replace bridge over Pithole Creek. |
| 27 September 1897 | Venango County bridge viewers inform county commissioners that a bridge is needed.                             |
| 15 June 1898      | County commissioners approve construction of the bridge.   |
| 15 July 1898      | Commissioners award Franklin stonemason Richard A. Bigley the contract to construct the bridge.                |
| 3 January 1899    | Bridge viewers report that the bridge is completed.  |
| 22 June 1988      | Pithole Stone Arch Bridge is listed in the National Register of Historic Places.                               |

## DESCRIPTION

The Pithole Stone Arch Bridge is a single-span masonry arch structure constructed from local sandstone quarried, most likely, from the Shenango sandstone formation underlying many upland portions of Venango County.<sup>1</sup> Masonry used in the structure consists of large coursed ashlar blocks. The bridge has a segmental arch and the road bed articulates directly with the arch ring. The relatively flat arch over Pithole Creek has span of 35'-0" and a rise of 6'-7", with a total under clearance of 17'-7", and crosses the stream on a perpendicular alignment. There are two travel lanes crossing the bridge within an average width of 16'-6", measured from curb to curb. The average overall width of the structure is 20'-0".

The bridge has two massive abutments and wing walls at each approach. According to a PennDOT inspection report, the western wing walls are 20'-6" long, and the eastern wing walls are 24'-0".<sup>2</sup> It appears that the bridge was originally constructed with a 2"-diameter pipe rail 2'-6" high on each parapet with each baluster spaced at 9'-2" and 9'-4" intervals. The sketch section through the bridge indicates that the structure had a low 1'-6" parapet and was originally unsurfaced, with a 4" earth cover.

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<sup>1</sup> Ralph W. Stone, *Building Stones of Pennsylvania*, Pennsylvania Geological Survey, Fourth Series, Bulletin M-15 (Harrisburg: Pennsylvania Geological Survey, 1932), 280.

<sup>2</sup> Pennsylvania Department of Transportation, "PennDOT Form 633 (Masonry Bridge Inspection Report): Pithole Stone Arch Bridge," bridge inspection file, BMS No. 60-1004-0120-0000, PennDOT District 1-0, Franklin, Pa.

## HISTORICAL INFORMATION

### Context

The Pithole Stone Arch Bridge spans Pithole Creek, which forms the boundary between President and Cornplanter townships, Venango County, Pennsylvania. Venango County is located in northwestern Pennsylvania, in the Appalachian Plateau physiographic province. The topography of the Appalachian Plateau consists of varying relief, from 500 to 1,000 feet above mean sea level. "The whole county is a high terrace deeply dissected in all directions by narrow ravines" wrote geologist Ralph Stone.<sup>3</sup> The major drainage in Venango County is the Allegheny River, which flows westerly through the county for a distance of about twenty miles.<sup>4</sup> Pithole Creek, over which the Pithole Stone Arch Bridge crosses, is the largest tributary of the Allegheny River in Venango County. The creek flows

in a southerly direction joining the Allegheny River near Oleopolis. This stream is about twenty feet wide at its mouth and flows through a narrow valley bordered by steep hills which are frequently broken by ravines.<sup>5</sup>

Maps published as early as 1865 show the Pithole Creek crossing on the line between President and Cornplanter townships on the road leading from Oil City to the Allegheny River.<sup>6</sup> According to the 1865 atlas, there was a store and a saw mill located on the Cornplanter Township approach and the landscape in the vicinity of the Pithole Creek crossing was comprised of farms interspersed with many petroleum and oil companies along the Pithole Creek drainage. Local historian William C. Darrah described the nineteenth century landscape of the Pithole Creek valley: "On the map, Pithole Creek looks like a diminutive Oil Creek, somewhat more rugged but strikingly similar." He added,

The small fast-flowing stream has cut a deep ravine through the hills, though in some level stretches it meanders in a little valley. In spring, when filled with melting snow or heavy rains, it changes course frequently, tearing new channels through the bottomlands or "flats." The countryside was heavily timbered with virgin white pine and mixed hardwoods, oak and beech, but on the rocky shaded

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<sup>3</sup> Stone, *Building Stones*, 280.

<sup>4</sup> Pennsylvania Department of Health, *Report on the Sanitary Survey of the Allegheny River Basin* (Harrisburg: Pennsylvania Department of Health, 1915), 101.

<sup>5</sup> Pennsylvania Department of Health, *Report on the Sanitary Survey*, 101-2.

<sup>6</sup> F. W. Beers, *Atlas of the Oil Region of Pennsylvania* (New York: F. W. Beers, A. D. Ellis, and G. G. Soule, 1865).

slopes and lateral ravines stately hemlock dominated the forest.... Away from the villages, the backwoods economy was a precarious agriculture.<sup>7</sup>

And, after the discovery of oil, it thrived on black gold.

The oil industry played a key role in the economic development of Venango County and in the formation of a viable transportation infrastructure.<sup>8</sup> Historians credit Edwin Drake with sparking the birth of the oil boom in northwestern Pennsylvania in 1859 when he struck oil near Titusville, Pennsylvania. In less than a year after Drake sunk his first well, oil was being pumped from the ground in the region at a rate of 1,200 barrels per day.<sup>9</sup> As the number of petroleum speculators grew in Venango County, so too did the number of towns. Many of the towns founded on the heels of the oil boom carry the names associated with the resource: Oil City, Petroleum Center, Oleopolis, and Pithole City.

Development along the banks of Pithole Creek did not really take off until after 1864. Between January of 1864 and the end of 1865, land leasers and oil speculators moved into the Pithole Creek valley leasing land and acquiring the oil rights for a percentage of the profits.<sup>10</sup> Many of the communities that sprang up during the oil boom were short-lived. Founded by speculators seeking a quick turnaround on their investments, "the people who settled boom towns had no intention of building for permanency," observed Darrah.<sup>11</sup> "They expected to move on with the next strike."

In May 1865, Pithole Creek lent its name to an oil boom town located ca. one mile upstream from the site of the Pithole Stone Arch Bridge. Speculators who drilled a viable well along Pithole Creek in January of that year platted a town of 500 lots and a grid of twenty-two streets. The Pithole boom was short-lived, however. In less than two years, most of the oil was gone and fires had destroyed many of the oil wells and buildings in the town.<sup>12</sup> Over the course of the next half century, the population of Pithole vanished and the town vanished. Today, the site of Pithole is a state historic site operated by the Commonwealth of Pennsylvania.

## Bridge

On 23 August 1897, residents of Complanter and President townships, Venango County, Pennsylvania, presented the Venango County Court of Quarter Sessions with a petition to appoint viewers and to approve the construction of a bridge over Pithole Creek on the road from

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<sup>7</sup> William C. Darrah, *Pithole, the Vanished City* (Gettysburg, Pa.: self-published, 1972), 4-5.

<sup>8</sup> Herbert C. Bell, *History of Venango County, Pennsylvania* (Chicago: Brown, Runk & Co., 1890), 385-7.

<sup>9</sup> Darrah, *Pithole*, 2-3.

<sup>10</sup> Darrah, *Pithole*, 6-13.

<sup>11</sup> Darrah, *Pithole*, 240.

<sup>12</sup> Darrah, *Pithole*.

Plumer to President. The petition, signed by thirty-five residents of President Township and twenty-nine residents of Cornplanter Township, informed the Court, "That a bridge is much needed over Pithole Creek."<sup>13</sup> R. T. Braugh and Boyd Poor were appointed as bridge viewers and they, along with artist James M. Hamilton, visited the bridge site on 27 September 1897. They recommended that a bridge with a 60'-0" span be constructed at the site and reported:

[A]fter carefully viewing the location of the proposed bridge and the parts adjacent thereto we find that there is a bridge already located there, belonging to the Townships of President and Cornplanter, but said bridge is in a decayed and unsafe condition.<sup>14</sup>

Although the bridge viewers determined that the petition to bridge Pithole Creek on the President and Cornplanter township line was valid, Venango County Commissioners determined that it was not "advisable to enter said bridge on record as a county bridge."<sup>15</sup> Rather, in a contract with President and Cornplanter townships, Venango County agreed to

assist the said townships of President and Cornplanter upon the said townships agreeing to do certain part of the work and maintain and keep the said bridge, approaches and guardrails etc, in proper condition and repair.<sup>16</sup>

The contract between the road commissioners of President (G. W. McAlmont, G. D. Colinger and S. B. Morris) and Cornplanter (Jesse Fry, George Wratten and John Reynolds) townships and Venango County Commissioners (J. P. McClelland, J. M. Black and J. T. Wallace) was signed 15 June 1898. The county agreed to "erect stone abutments and an iron superstructure over said stream at the point designated in the report of viewers" and the townships were to be responsible for building "suitable approaches to said bridge and proper and suitable guard-rails where necessary."<sup>17</sup>

Contrary to the contract between the county and the townships to build a bridge with an iron superstructure, however, Venango County awarded Franklin stonemason Richard A. Bigley a contract for "stonework" on a "Stone Bridge over Pithole" 15 July 1898, one month after signing its contract with the townships. The contract was recorded in Venango County Bridge

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<sup>13</sup> Petition, Venango County, *Quarter Session Petition Docket*, No. 7 (Nov. 1897), Venango County Courthouse, Franklin, Pa.

<sup>14</sup> Viewers' Report, Venango County, *Quarter Session Petition Docket*, No. 7 (Nov. 1897). Unfortunately, there are no surviving descriptions of the bridge that preceded the Pithole Stone Arch Bridge beyond the general one regarding its condition offered by the bridge viewers appointed by Venango County in 1897.

<sup>15</sup> Contract, Venango County Supervisor's files, Venango County Courthouse, Franklin, Pa.

<sup>16</sup> Contract.

<sup>17</sup> Contract.

Book No. 1 with the reminder, "Not a County Bridge" entered below the bridge's name in the entry.<sup>18</sup>

### Richard A. Bigley

Richard A. Bigley, the stonemason who built the Pithole Stone Arch Bridge, was born in Philadelphia on 15 December 1846. Bigley relocated to the city of Franklin, Venango County at age 17 where he became a stonemason. In addition to the Pithole Stone Arch Bridge, he is credited with building a bridge near Franklin known locally as the "Big Rock Bridge." According to one history of Franklin County, the "Big Rock Bridge" was constructed across the Allegheny River in 1879 at a point ca. one mile south of Franklin.<sup>19</sup> Bigley died at age 83 in his home at 641 Elk Street in Franklin on the morning of 8 June 1928. According to his obituary, published in the *Venango Citizen-Press*, "he attained prominence and success as a contractor, mostly in construction of bridges."<sup>20</sup> By the time of his death, Bigley had been retired for a quarter of a century. His probate inventory indicates that he left behind a modest estate of \$8,288.65 — eighty-four shares of stock in the Columbia Gas and Electric Corporation and no real estate.<sup>21</sup>

### Construction

Stonemason Bigley was to build the Pithole Stone Arch bridge at a rate of \$4.34 per perch of masonry.<sup>22</sup> According to the final accounting of the bridge's construction, it required 628 perches of stone (15,543 square feet). Bigley was paid by four county work orders that show construction on the bridge was underway by 23 September 1898.<sup>23</sup> The first work order (No. 576) was for \$1,000 and the second (No. 614), paid November 4, was for \$1,500. Two smaller work orders were paid 3 July 1899 (\$175.52) and 18 July 1900 (\$50.00). The dates of the payments and amounts paid suggest that the bridge was constructed during the late summer and fall of 1898. A petition filed with the Court of Quarter Sessions 31 October 1898 requested that

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<sup>18</sup> Venango County, *Bridge Book*, vol. 1 (Venango County Courthouse, Franklin, Pa.), 118.

<sup>19</sup> Bell, *History of Venango County*, 387.

<sup>20</sup> *Venango Citizen-Press*, 13 Jun. 1928.

<sup>21</sup> Venango County, *Register of Wills*, No. 87 (Apr. 1928), Venango County Courthouse, Franklin, Pa.

<sup>22</sup> Stone was measured in cords or perches. A perch generally consisted of 24-3/4 cubic feet. In linear measure, a perch was 16'-6"; one description of how masons measured a perch of stone suggests that it measured 16'-6" in length, was 1'-0" high and 4'-0" wide; see Harley J. McKee, *Introduction to Early American Masonry* (New York: National Trust for Historic Preservation and Columbia University, 1973), 20.

<sup>23</sup> Venango County, *Bridge Book*, 1:118.

Venango County commissioners appoint viewers because "said abutments and arch are now completed."<sup>24</sup>

On 3 January 1899, viewers C. J. Greenfield, J. Leach and Albert Tyrrel reported that the bridge was complete. Initially, however, the viewers felt that the bridge had not been built to specifications detailed in the county's contract with Bigley.<sup>25</sup> The viewers reported:

[W]e inspected, in a careful and complete manner the bridge ... and find that the bridge, with the exception of the cement mortar used in the coping and course of stone next below, which is extremely poor and will have to be replaced before a great while, is complete in accordance with the specifications and contract....<sup>26</sup>

The viewers recommended that Bigley be docked \$50 "from the contract price to make good said defect." In addition to what the viewers believed was faulty masonry work in the coping and upper courses of the bridge's stone work, that also reported that the bridge was not properly constructed to accommodate the flow of Pithole Creek:

We do not consider that the Archway is sufficiently large to take the water during extreme high water. We do not consider that the bridge is placed to advantage as the Archway is at least 10 feet too far to the east of the stream and on the side opposite the current. The N.W. wing and N. end of abutment are too square to the stream and the wing is too short to protect its bank.<sup>27</sup>

The viewers subsequently wrote that the bridge was valued at \$2,300: "We cannot approve of the bridge other than the construction by the Contractor less the fifty (50) dollars previously stated on account of poor cement mortar."<sup>28</sup> To support their argument, the viewers included a sketch of the bridge's north elevation with the stream clearly flowing into the northwest wing wall.

Bigley refuted the viewers' charges that he used inferior cement in the coping and upper courses of the bridge. At a hearing in Venango County court 21 October 1899, Bigley testified that he had in fact complied with the terms of the contract. Rather, he countered, because of the amount of cement was overestimated, he had built a better bridge than was called for:

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<sup>24</sup> Petition, Venango County, *Quarter Session Petition Docket*, No. 5 (Jan. 1899).

<sup>25</sup> Although there is a notation in papers archived at the Venango County courthouse that the contract with Bigley is "stored in a safe" in the County Supervisor's office, the contract could not be located in the papers removed from that safe, which are maintained in filing cabinets in the courthouse basement.

<sup>26</sup> Viewers' Report, Venango County, *Quarter Session Petition Docket*, No. 5 (Jan. 1899).

<sup>27</sup> Viewers' Report (Jan. 1899).

<sup>28</sup> Viewers' Report (Jan. 1899).

The bridge was built in pursuance of the contract. I was not present when the viewers made a view of the bridge after it was finished. The view was made last fall some time, but I knew nothing about it until last July or June. That was some time after the report of viewers had been confirmed absolutely. The viewers made a reduction of \$50 on the contract price. The work was all done as called for by the contract. The contract required a mortar to be mixed one part cement and five parts sand. That was followed out until the finishing of the work, when we found out we had more cement on hand than was necessary to complete the work with. I therefore gave orders to the men to use the cement all that was possible, by mixing one part cement to 3 parts sand. The last two courses were finished with that kind of mortar and still we had cement left that we gave away after the job was done. This change in amount of cement would make the color of the mortar bluer or lighter in color. The quality of the mortar was better. If there had been no mortar used, ten dollars would have paid for all the cement to have laid the courses ~~claimed~~ complained of by the viewers at the rate of one part cement and 5 parts sand.<sup>29</sup>

After Bigley testified, his foreman, Charles Lundager, confirmed his employer's account. "I worked on the bridge in question," said Lundager,

I set the stone and was foreman for Mr. Bigley. The first mortar used on the job was one part cement and 5 parts sand. Towards the finish of the work we found we had more cement than we needed, therefore we used mortar made of one part cement and three parts sand for the two last courses. This change made the mortar better and lighter in color. It would make a better job I presume. I have been engaged in stone work for the last 13 years and have used from 3 to 5 cars of cement every summer. There should have been no reduction in the price of the work on account of the change in the mortar.<sup>30</sup>

On 12 April 1900, viewers Greenfield and Tyrrel — "The other viewer — James Leach is dead," they reported — revisited the Pithole Stone Arch Bridge and revised their initial report, this time in favor of Bigley:

We the ... bridge viewers, upon a more thorough investigation and in behalf of the sworn statement made by the Contractor and County Commissioners feel satisfied now that the cement mortar in the two upper courses of stone was not defective but its condition at the time of our inspection, was due to frost, the same having been laid late in the fall and yet within the time specified by contract thus relieving the Contractor of this responsibility [sic]. We therefore in consideration

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<sup>29</sup> Viewers' Report (Jan. 1899).

<sup>30</sup> Viewers' Report (Jan. 1899).

of the above, reccomend [sic] that the Contractor be allowed the full contract price.<sup>31</sup>

Bigley received his final payment — the \$50 withheld by Venango County — on 18 July 1900. The total cost to construct the bridge, according to Venango County records, was \$2,725.52.

### **Pithole Stone Arch Bridge**

The Pithole Stone Arch Bridge was owned and maintained by the townships of President and Cornplanter until at least 1935. PennDOT records indicate that the Commonwealth of Pennsylvania took possession of the structure under provisions of an act passed by the Pennsylvania Legislature 15 July 1935, whereby "the County's or township's responsibility" for maintenance of bridges on "State highway routes" is "assumed by State."<sup>32</sup>

The bridge retains much of its integrity. Since its acquisition by the Commonwealth of Pennsylvania, PennDOT (and its predecessor) have done little to alter the original structure. Alterations to the bridge appear to have been limited to at least two replacements of guard rails. According to a sketch of the bridge prepared 15 July 1942, the structure had a 2"-diameter pipe railing anchored in the coping and upper course of stone work. PennDOT records also indicate that in 1949 a wing wall was replaced and a false footer constructed.<sup>33</sup>

In June 1988, the Pithole Stone Arch Bridge was listed in the National Register of Historic Places as a contributing element to the multiple resource nomination Highway Bridges Owned by the Commonwealth of Pennsylvania, Department of Transportation.<sup>34</sup> A 1995 article published in the Oil City newspaper, *The Derrick*, reported on historic "one-lane bridges" in Venango County. The Pithole Stone Arch Bridge was one of several rural bridges described in the feature article. "Almost always old, sometimes quaint and charming," wrote reporter Paul Frederick of the bridges, "but more than often sturdy and utilitarian, these venerable structures are mute testimonies to the art of bridge building in America."<sup>35</sup>

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<sup>31</sup> Viewers' Report (Jan. 1899).

<sup>32</sup> U.S. Public Law 344 (1935). PennDOT District 1-0 officials could not locate any documentation recording the transfer of the bridge to the Commonwealth of Pennsylvania. The earliest inspection report prepared for the bridge is dated 22 Jun. 1942. The bridge may have been acquired by PennDOT at any point between 15 Jul. 1935 and Jun. 1942.

<sup>33</sup> The Pennsylvania Bureau for Historic Preservation bridge survey form for the Pithole Stone Arch Bridge incorrectly gives 1974 as the date of wing wall replacement and false footer construction.

<sup>34</sup> The National Register of Historic Places registration form incorrectly indicates that the bridge was built in 1897, an error derived from PennDOT's inspection records; see "PennDOT Form 633 (Masonry Bridge Inspection Report): Pithole Stone Arch Bridge." The incorrect date also appears in Pennsylvania Department of Transportation, *Historic Highway Bridges in Pennsylvania* (Harrisburg: Pennsylvania Department of Transportation, 1986), 44, which also incorrectly identifies the builder as "R. A. Bigler."

<sup>35</sup> Paul Frederick, "One-Lane Bridges Span Decades," *The Derrick* (18 Dec. 1995): 1.

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